REMARKS

The Office Action dated May 28, 2008 has been received and its contents carefully noted. Claims 1-20 are pending in this application. With this paper, claims 16 and 19 are amended, claim 18 is canceled, and claim 21 is added, so that claims 1-17 and 18-21 now remain pending in the application.

Claim 16 has been amended to incorporate the features of allowable dependent claim 18. Subsequently, claim 18 has been canceled. Allowable claim 19 has been amended to incorporate the features of independent claim 16 from which it depends. No new matter has been introduced by way of amendment.

Drawing Objections

At section 2 of the Office Action, the Office objects to Figure 1, which should be desiganated as "Prior Art." Applicant submits herein a replacement sheet including Figure 1 having a "Prior Art" designation thereon. Accordingly, applicant respectfully requests reconsideration and withdrawal of the drawing objection.

Claim Rejections under 35 U.S.C. §103

At sections 3-4 of the Office Action, the Office rejects claims 1-4, 6-10 and 16-17 under 35 U.S.C. §103(a) as being unpatentable over Tore (US Patent 6,310,926) in view of Beukema (US Patent 6,393,083). Of these, claims 1 and 16 are independent claims.

With regard to claim 16, applicant has amended claim 16 to incorporate the features of allowable dependent claim 18. Applicant respectfully submits that in view of this amendment and the status of claim 18 as an allowable claim, amended claim 16 is now allowable. Claim 17 depends from claim 16, and therefore applicant respectfully submits that in view its dependency, claim 17 is also allowable. Accordingly, applicant respectfully requests reconsideration and withdrawal of the rejection of claims 16-17 under 35 USC §103(a).

With regard to claim 1, the Office asserts that Tore discloses all the features of claim 1 except "at least one multiplication operation is carried out solely by means of shift and adding operations," for which the office turns to Beukema. Applicant respectfully disagrees that the combination of references discloses or suggests

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In the Drawings

Please replace the drawing sheet containing Figure 1 with the attached replacement sheet.

every feature of claim 1. In particular, Tore fails to disclose or suggest "at least partially eliminating an <u>accumulation of a phase error</u> of the partial signal, caused by a sampling frequency error, <u>over the sequence of the partial signals</u>, such that the accumulation is negligible."

The Office refers to Figure 6 of Tore, which shows an equalizer 17, however, the description of Figure 6 (column 4, line 45 to column 5, line 10) with regard to the functionality of the equalizer reveals that the equalizer disclosed there does not include the above-recited feature of the claimed invention. The equalizer 17 of Tore is based on "extracting only the real part of the received complex number corresponding to the pilot tone... That is the real part indicates the phase deviation and phase of the sampling rate f_{sampR} of the numerically-controlled oscillator NCO can be controlled on this extracted real part" (Tore, column 4, lines 51-57). Tore fails to disclose or suggest eliminating an accumulation of a phase error of the pilot over a sequence of pilots, and therefore Tore fails to disclose or suggest "eliminating an <u>accumulation of a phase error</u> of the partial signal, caused by a sampling frequency error, <u>over the sequence of the partial signals,</u>" as claimed. Instead, each pilot signal is treated in an isolated manner, i.e. without consideration of such a phase-error *accumulation* over a *sequence* of pilot signals.

Applicant directs the Office to page 9, line 15 through page 11, line 15 of the specification of the present invention for a thorough discussion of the accumulation of the phase error caused by the sampling-frequency deviation of the claimed invention, a portion of which follows:

> Analysis shows that the sampling frequency error, due to the <u>accumulation from one symbol to another</u>, obtains a particularly great weight in the overall phase error. As it changes with each symbol, correction thereof is particularly difficult. In the method according to the invention therefore the equalization step includes a step of at least partially <u>eliminating an accumulation of a phase error caused by a sampling frequency error in the partial signal over the sequence of the partial signals</u> in such a way that the accumulation is negligible. The phase error caused by the sampling frequency can be disregarded by virtue of that measure in terms of correction of the remaining phase error.
> In the method according to the invention the estimation step includes a step of detecting a <u>plurality</u> of predetermined pilot signals and a step of determining a phase correction factor on the basis of the detected pilot signals, wherein at least one multiplication operation is performed just by means of shift and adding operations.
> Shift and adding operations are particularly simple operations with digital data, which can be performed at great speed. The idea of the invention of using shift and adding operations in determining the phase correction factor is closely linked in the method according to the invention to the previously stated method steps. The possibility of disregarding the phase error caused by the sampling frequency affords the prerequisite for simplifying estimation of the phase error in such a way that its mathematical calculation can be reduced at least predominantly and, in a particularly

preferred embodiment described hereinafter, even completely, to the implementation of shift and adding operations, using the previously determined pilot signals.

Accordingly the method according to the invention achieves a high speed in determining the phase error, in comparison with known methods. Just the replacement of a multiplication operation by shift and adding operations affords speed advantages over known methods. In that way, the delay in the spread of the received signal, which is caused by the use of such a method, becomes particularly slight. That is of significance in particular in communication processes by way of wireless channels. [Emphasis added]

The phase correction factor, according to the method of claim 1, is determined on the basis of "the detected pilot *signals*," not on the basis of a single pilot signal. This makes clear that both the estimation and the equalization take into account the sequence of the partial signals, and not just the current pilot signal to be equalized. On the contrary, Tore fails to disclose that in the equalization step, more than one "pilot tone" is considered. In fact, since the method of Tore is based on the extracted real part of a single pilot tone, the method is incompatible with and contrary to taking into account a plurality of pilot tones synchronously. Thus, Tore fails to disclose or suggest "the equalization step includes a step of at least partially eliminating an accumulation of a phase error of the partial signal, caused by a sampling frequency error, over the sequence of the partial signals, such that the accumulation is negligible, and the estimation step includes a step of detecting a plurality of predetermined pilot signals and a step of determining a phase correction factor on the basis of the detected pilot signals, wherein at least one multiplication operation is carried out solely by means of shift and adding operations," as recited in claim 1.

Beukema is concerned with a digital phase shifter and is cited for the use of multiplication operations by means of shift and adding operations. Beukema, however, fails to disclose or suggest the features of claim 1 that are lacking in Tore, namely "the equalization step includes a step of at least partially eliminating an accumulation of a phase error of the partial signal, caused by a sampling frequency error, over the sequence of the partial signals, such that the accumulation is negligible, and the estimation step includes a step of detecting a plurality of predetermined pilot signals and a step of determining a phase correction factor on the basis of the detected pilot signals, wherein at least one multiplication operation is carried out solely by means of shift and adding operations." Therefore, applicant respectfully submits that Tore and Beukema, taken singly or in combination, fail to

render claim 1 obvious. Accordingly, applicant respectfully requests reconsideration and withdrawal of the rejection of claim 1 under 35 USC §103(a).

Claims 2-4 and 6-10 ultimately depend from claim 1 and recite additional features not recited in claim 1. For the reasons regarding claim 1 above, and at least in view of their dependencies, applicant respectfully submits that claims 2-4 and 6-10 are also patentable over Tore in view of Beukema. Accordingly, applicant respectfully requests reconsideration and withdrawal of the rejection of claims 2-4 and 6-10 under 35 USC §103(a).

New Claim

New claim 21 is a device claim that finds support in claim 1. No new matter has been introduced.

Allowable Subject Matter

At section 5 of the Office Action, the Office indicates that claims 5, 11-15 and 18-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant has canceled claim 18 and incorporated its features into claim 16. Applicant has amended claim 19 to incorporate the limitations of independent claim 16 from which it depends. Claim 20 is dependent from claim 19 and recites additional features not recited in claim 19. Accordingly, applicant respectfully submits that claims 19 and 20 are allowable.

With regard to claims 5 and 11-15, these claims ultimately depend from claim 1 and recited additional features not recited in claim 1. In view of the above reasoning with regard to claim 1, applicant respectfully submits that claim 1 is patentable over the cited prior art. Accordingly, applicant submits that claims 5 and 11-15 are also allowable, at least in view of their dependencies.

CONCLUSION

For all the foregoing reasons it is believed that claims 1-17 and 19-21 are in condition for allowance and their passage to issue is earnestly solicited.

Respectfully submitted,

Date:___\l.24.08___

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